

US CLAIMS

1. A process for making a hydrogel comprising from about 10 to 90 wt% water, from about 10 to 60 wt% of cross-linked hydrophilic polymer made from at least one starting monomer type, and from about 10 to 80 wt% of at least one polyol, said process comprising the steps of:
 - 1) polymerizing said starting monomer(s) from within a reaction medium comprising from about 10 to 90 wt% of water, from about 10 to 60 wt% of said starting monomer(s) and from about 10 to 80 wt% of said polyol(s), to thereby form a hydrogel;
and thereafter
 - 2) chemically treating said hydrogel with a compound which reacts with residual starting monomer(s), impurity(s) and/or any by-products produced by said polymerization reaction, to thereby reduce the concentration of said residual starting monomer(s) , impurity(s) and/or by-products within said hydrogel.
2. A process according to claim 1 wherein the residual starting monomer(s) concentration in the hydrogel product of step 1), is reduced to below about 10000 ppm.
3. A process according to claim 2 wherein the residual monomer(s) concentration in the hydrogel product of step 1), is reduced to below about 10 ppm.
4. A process according to claim 1 wherein the polymerization of said starting monomer(s) is conducted at a pH from about 3.5 to 7.
5. A process according to claim 1 wherein said formed hydrogel comprises from about 20 to 70 wt% of water.
6. A process according to claim 1 wherein said chemical treatment in step 2) comprises adding to the hydrogel product of step 1) a nucleophile which reacts with said residual starting monomer(s), impurity(s) and/or by-products by an addition reaction.

7. A process according to claim 1 wherein said by-product(s) produced by said polymerization reaction, comprise α,β -unsaturated carbonyl(s) produced from said polyol(s).
8. A process according to claim 7 wherein said polyol(s) comprise glycerol.
9. A process according to claim 1 wherein said by-product(s) produced by said polymerization reaction, comprise acrolein.
10. A process according to claim 6 wherein said nucleophile is selected from the group consisting of ammonia, amines, polyamines, hydroxylamine, hydrazine, thiols, sulfites metabisulfites and bisulfites.
11. A process according to claim 10 wherein said nucleophile comprises bisulfite.
12. A process according to claim 11 wherein said bisulfite is present in amounts of less than about 30000 ppm, with respect to the hydrogel product of step 1).
13. A process according to claim 12 wherein the bisulfite is present in amounts of less than about 3000 ppm, with respect to the hydrogel product of step 1).
14. A process according to claim 1 wherein the polymerization of said starting monomer(s) is conducted at least partly by means of subjecting said starting monomer(s), said polyol(s) and said water to UV irradiation.
15. A process according to claim 14 wherein said reaction medium of step 1), comprises a photoinitiator.
16. A process according to claim 15 wherein said photoinitiator is selected from the group consisting of Darocur 1173, Irgacure 2959, Irgacure 500, and Irgacure 184.
17. A process according to claim 16 wherein said photoinitiator is used in said reaction medium at a concentration of less than about 5 wt%.

18. A process according to claim 17 wherein said photoinitiator is used in said reaction medium at a concentration of less than about 0.4 wt%.
19. A process according to claim 14 wherein the integrated UV intensity at wavelengths less than about 280 nm is less than about 10% of the total integrated UV intensity with wavelengths less than about 400 nm.
20. A process according to claim 19 wherein said polymerization is carried out by subjecting said starting monomer(s), said polyol(s) and said water to a total amount of UVA energy ranging from about 0.1 to 30 J/cm².
21. A process according to claim 1 wherein said starting monomer(s) comprise acrylic acid.
22. A process according to claim 1 wherein said hydrogel is adhesive.
23. A hydrogel comprising from about 10 to 90 wt% water, from about 10 to 60 wt% of cross-linked hydrophilic polymer made from starting monomer(s), and from about 10 to 80 wt% of a at least one polyol, said hydrogel being prepared by polymerizing said starting monomer(s) in the presence of said water and polyol(s), wherein said hydrogel comprises less than about 100 ppb of α,β -unsaturated carbonyl by-product(s) derived from said polyol(s) during polymerization.
24. A hydrogel according to claim 23 wherein said hydrogel comprises less than about 20 ppb of α,β -unsaturated carbonyl by-product(s) derived from said polyol(s) during polymerization.
25. A hydrogel according to claim 23 wherein said polyol(s) comprise glycerol.
26. A hydrogel according to claim 23 wherein said α,β -unsaturated carbonyl by-product comprises acrolein.
27. A hydrogel according to claim 23 which comprises less than about 200 ppm of residual starting monomer(s).

28. A hydrogel according to claim 27 which comprises less than about 10 ppm of residual starting monomer(s).
29. A hydrogel according to claim 23 wherein said starting monomer(s) comprise acrylic acid.
30. A hydrogel according to claim 22 wherein said hydrogel is adhesive.
31. A hydrogel comprising from about 10 to 90 wt% of water, from about 10 to 60 wt% of cross-linked hydrophilic polymer made from starting monomer(s), and from about 10 to 80 wt% of polyol(s), said hydrogel being prepared by polymerizing said starting monomer(s) in the presence of said water and said polyol(s) and thereafter, treating the formed product with a nucleophilic compound which reacts with α,β -unsaturated carbonyl by-product(s) derived from said polyol(s) during polymerization, wherein said hydrogel comprises more than about 20 ppb of nucleophilic addition product(s) of said α,β -unsaturated carbonyl by-product(s) with said nucleophilic compound.
32. A hydrogel according to claim 31 wherein said hydrogel comprises more than about 1000 ppb of nucleophilic addition product(s) of said α,β -unsaturated carbonyl by-product(s) with said nucleophilic compound.
33. A hydrogel according to claim 31 wherein said polyol(s) comprise glycerol
34. A hydrogel according to claim 31 wherein said nucleophilic addition product(s) comprise sodium 3-propanal sulfonate, 1-hydroxy-2-propene-1-sulfonate or 1-hydroxy-1,3-propane disulfonate.
35. A hydrogel according to claim 31 wherein said starting monomer(s) comprise acrylic acid.
36. A hydrogel according to claim 31 wherein said hydrogel is adhesive.